

## Case Study: Online Shopping Cart System

### Scenario:

You are tasked with developing an online shopping cart system for an e-commerce website. The system should handle products, customers, and orders, allowing customers to add products to their cart, view the cart contents, and proceed to checkout.

### Requirements:

#### 1. Product Class:

- o Attributes: productId (String), name (String), price (double), and stockQuantity (int).
- o Methods: updateStockQuantity(int quantity) to adjust stock levels when a product is purchased.

#### 2. Customer Class:

- o Attributes: customerId (String), name (String), email (String), and cart (List<Product>).
- o Methods: addToCart(Product product), removeFromCart(Product product), viewCart(), and checkout().

#### 3. Order Class:

- o Attributes: orderId (String), customer (Customer), products (List<Product>), totalAmount (double), and orderDate (LocalDateTime).
- o Methods: calculateTotalAmount() to compute the total cost of the order.

#### 4. Inventory Class:

- o Attributes: products (List<Product>).
- o Methods: addProduct(Product product), getProductById(String productId), and updateProductStock(String productId, int quantity).

### Tasks:

#### 1. Implement the Product Class:

- o Define the class with appropriate attributes and methods.
- o Implement logic to update the stock quantity when products are purchased.

## 2. Implement the Customer Class:

- o Define the class with attributes and methods to manage the shopping cart.
- o Implement methods to add products to the cart, remove products from the cart, view the cart contents, and proceed to checkout.

## 3. Implement the Order Class:

- o Define the class with attributes and methods to handle order details.
- o Implement the calculateTotalAmount() method to compute the total cost of the order.

## 4. Implement the Inventory Class:

- o Define the class to manage the product inventory.
- o Implement methods to add products, retrieve a product by its ID, and update stock levels.

## 5. Develop a Main Class to Test the System:

- o Create instances of Product, Customer, and Inventory.
- o Add products to the inventory.
- o Simulate adding products to the customer's cart, viewing the cart, and checking out.

```
public class Product {  
    private String productId;  
    private String name;  
    private double price;  
    private int stockQuantity;  
  
    public Product(String productId, String name, double price, int stockQuantity) {
```

```
        this.productId = productId;

        this.name = name;

        this.price = price;

        this.stockQuantity = stockQuantity;
    }

    public String getProductId() {
        return productId;
    }

    public String getName() {
        return name;
    }

    public double getPrice() {
        return price;
    }

    public int getStockQuantity() {
        return stockQuantity;
    }

    public void updateStockQuantity(int quantity) {
        this.stockQuantity -= quantity;
    }
}

public class Main {

    public static void main(String[] args) {

        Product product = new Product("P001", "Product 1", 10.99, 10);
```

```
System.out.println("Product ID: " + product.getId());  
System.out.println("Product Name: " + product.getName());  
System.out.println("Product Price: " + product.getPrice());  
System.out.println("Product Stock Quantity: " + product.getStockQuantity());  
  
product.updateStockQuantity(2);  
  
System.out.println("Updated Product Stock Quantity: " + product.getStockQuantity());  
}  
}
```

```
1 Product ID: P001  
2 Product Name: Product 1  
3 Product Price: 10.99  
4 Product Stock Quantity: 10  
5 Updated Product Stock Quantity: 8
```